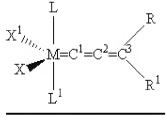
Amendments to the Claims:

1-8. (Cancelled)

9. (Currently amended) A catalytic complex of the formula:



wherein M is Os or Ru;

~~C^1, C^2, and C^3 are sp^2 hybridized carbons;~~

R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, aryloxy, C_1-C_{20} alkylthio, C_1-C_{20} alkylsulfonyl, and C_1-C_{20} alkylsulfinyl, each R and R^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group;

X and X^1 are independently selected from the group consisting of anionic ligands;

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

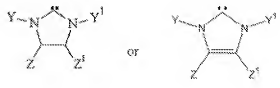
L^1 is a nucleophilic carbene.

10. (Cancelled)

11. (Previously presented)A catalytic complex according to claim 9, wherein L is a phosphine.

12. (Original) A catalytic complex according to claim 9, wherein at least 2 of X, X^1, L or L^1 are bonded together to form a multidentate ligand.

13. (Previously Presented) A catalytic complex according to claim 9, wherein said nucleophilic carbene is of the formula:

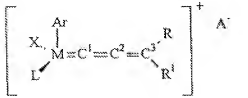


wherein

Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} ∈ alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} C alkynyl, C_2[[$_1$]]-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

14. (Currently amended) A catalytic complex of the formula:



~~wherein C^1 and C^2 are sp-hybridized carbons and C^3 is an sp^3-hybridized carbon,~~

wherein either or both of C^1 and C^2 are optionally absent;

M is selected from the group consisting of Os and Ru;

R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy aryloxy, C_1-C_{20} alkylthio, C_1-C_{20} alkylsulfonyl, and C_1-C_{20} alkylsulfinyl, each R and R^1 optionally being substituted with C_1-C_5 alkyl,

halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group;

X is an anionic ligand;

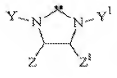
L is a nucleophilic carbene;

Ar is an aryl substituent, bonded to M by an η^6 bond; and

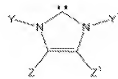
A^- is an inorganic anion or an organic anion.

15-16. (Cancelled)

17. (Previously presented) A catalytic complex according to claim 14, wherein said nucleophilic carbene is of the formula:



or



wherein

Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} a1kyny1oxy and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

18. (Original) A method of making a nucleophilic carbene, said method comprising:

a) contacting a substituted or unsubstituted aniline with an approximately one-half equimolar amount of paraformaldehyde under an inert atmosphere to make a first reaction mixture;

b) heating said first reaction mixture until said paraformaldehyde dissolves;

c) adding an approximately one-half equimolar amount of a dialkoxyacetaldehyde to make a second reaction mixture; and

d) heating said second reaction mixture for a time and under conditions sufficient to make a nucleophilic carbene.

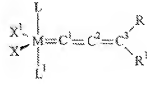
19. (Original) The method of claim 18, wherein said aniline is 2,4,6-trimethylaniline.

20. (Original) The method of claim 18, wherein said aniline is 2,6-diisopropylaniline.

21. (Original) The method of claim 18, further comprising the step of hydrogenating the nucleophilic carbene to produce a non-aromatic nucleophilic carbene.

22. (Cancelled)

23. (Currently amended) A method of performing ring closing metathesis, said method comprising contacting a diene with a catalytic complex under conditions appropriate, and for a time sufficient to produce a cyclic alkene, wherein the catalytic complex has the formula:



wherein M is Os or Ru;

~~C^1 and C^2 are sp-hybridized carbons and C^3 is a sp^3-hybridized carbon,~~ wherein C^2 is optionally absent;

R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, aryloxy, C_1-C_{20} alkylthio, C_1-C_{20}

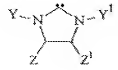
alkylsulfonyl, and C_1-C_{20} alkylsulfinyl, each R and R′ optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group;

X and X^1 are independently selected from the group consisting of anionic ligands;

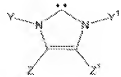
L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L^1 is a nucleophilic carbene.

24. (Previously presented)The method of claim 23, wherein the nucleophilic carbene has the formula:



or



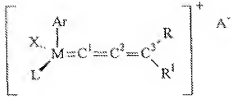
wherein

Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

25. (Currently amended) A method of performing ring closing metathesis, said method comprising contacting a diene with a catalytic complex under conditions appropriate, and for a time sufficient to produce a cyclic alkene, wherein the catalytic complex has the

formula:



wherein

~~C^1 and C^2 are sp-hybridized carbons and C^3 is an sp^2 hybridized carbon, wherein~~ either or both of C^1 and C^2 are optionally absent;

M is selected from the group consisting of Os and Ru;

R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, aryloxy, C_1-C_{20} alkylthio, C_1-C_{20} alkylsulfonyl, and C_1-C_{20} alkylsulfinyl, each R and R^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group;

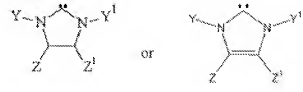
X is an anionic ligand;

L is a nucleophilic carbene;

Ar is an aryl substituent, bonded to M by an η^6 bond; and

A^- is an inorganic anion or an organic anion.

26. (Previously presented) The method of claim 25, wherein the nucleophilic carbene has the formula:



wherein

Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

27. (Previously presented)The catalytic complex according to claim 9, wherein X and X^1 are independently selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl sulfonate.

28. (Previously presented)The catalytic complex according to claim 27, wherein X and X^1 are both chloride.

29. (Previously presented) The catalytic complex of claim 9, wherein the nucleophilic carbene ligand comprises a carbene carbon further bonded to two heteroatoms having electronegativity greater than that of carbon, and wherein the heteroatoms are independently selected from the group consisting of nitrogen, oxygen, and sulfur.

30. (Previously presented) The catalytic complex of claim 29, wherein the nucleophilic carbene ligand comprises a saturated or unsaturated 1,3-diheterocyclic compound.

31. (Previously presented)The catalytic complex of claim 9, wherein the complex is linked to a solid support by means of a link between at least one of said anionic ligands and said solid support.

32. (Previously presented)The catalytic complex according to claim 9, wherein the complex is linked to a solid support by means of a link between the nucleophilic carbene and said solid support.

33. (Previously presented)The catalytic complex according to claim 14, wherein X is selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl

sulfonate.

34. (Previously presented)The catalytic complex according to claim 33, wherein X is chloride.

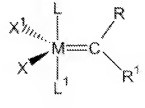
35. (Previously presented)The catalytic complex of claim 14, wherein the nucleophilic carbene ligand comprises a carbene carbon further bonded to two heteroatoms having electronegativity greater than that of carbon, wherein the heteroatoms are independently selected from the group consisting of nitrogen, oxygen, and sulfur.

36. (Previously presented) The catalytic complex of claim 35, wherein the nucleophilic carbene ligand comprises a saturated or unsaturated 1,3-diheterocyclic compound.

37. (Previously presented)The catalytic complex of claim 14, wherein the complex is linked to a solid support by means of a link between said anionic ligand and said solid support.

38. (Previously presented)The catalytic complex of claim 14, wherein the complex is linked to a solid support by means of a link between said nucleophilic carbene and said solid support.

39. (Previously Presented) A catalytic complex of the formula:



wherein M is Os or Ru;

in which carbon atom C is bonded to up to two groups R and R^1;

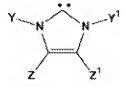
R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, aryloxy, C_1-C_{20} alkylthio, C_1-C_{20}

alkylsulfonyl, and C_1-C_{20} alkylsulfinyl, each R and R^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group;

X and X^1 are independently selected from the group consisting of anionic ligands;

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L^1 is of the formula

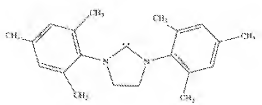


wherein Y and Y^1 are each independently an aryl group substituted with halogen, C_1-C_5 alkyl, or C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2[[,]]-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

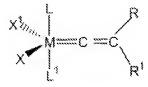
40-43. (Cancelled)

44. (Previously presented)The catalytic complex according to claim 9, wherein L is -P(cyclohexyl)$_3$, -P(cyclopentyl)$_3$ or -PPh$_3$ and L^1 is

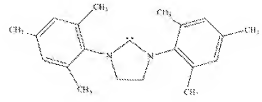


45-46. (Cancelled)

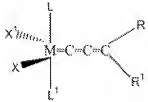
47. (Previously presented)The method according to claim 23, wherein the catalytic complex has the formula:



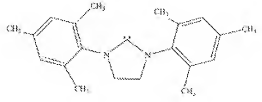
48. (Previously presented) The method according to claim 23, wherein L is —P(cyclohexyl)$_3$, —P(cyclopentyl)$_3$ or —PPh$_3$ and L^1 is



49. (Previously presented)The method according to claim 23, wherein the catalytic complex has the formula:



50. (Previously presented)The method according to claim 49, wherein L is —P(cyclohexyl)$_3$, —P(cyclopentyl)$_3$, or —PPh$_3$ and L^1 is



51. (Previously presented)A catalytic complex according to claim 13, wherein Y and Y^1 are both 2,4,6-trimethylphenyl and Z and Z^1 are both hydrogen.

52. (Previously presented)A catalytic complex according to claim 13, wherein Y and Y^1 are both 2,6-diisopropylphenyl and Z and Z^1 are both hydrogen.

53. (Previously presented)A catalytic complex according to claim 17, wherein Y and Y^1 are both 2,4,6-trimethylphenyl and Z and Z^1 are both hydrogen.

54. (Previously presented)The catalytic complex according to claim 17, wherein Y and Y^1 are both 2,6-diisopropylphenyl and Z and Z^1 are both hydrogen.

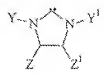
55. (Previously presented)The method according to claim 24, wherein Y and Y^1 are both 2,4,6-trimethylphenyl and Z and Z^1 are both hydrogen.

56. (Previously presented)The method according to claim 24, wherein Y and Y^1 are both 2,6- diisopropylphenyl and Z and Z^1 are both hydrogen.

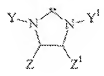
57. (Previously presented)The method according to claim 26, wherein Y and Y^1 are both 2,4,6-trimethylphenyl and Z and Z^1 are both hydrogen.

58. (Previously presented)The method according to claim 26, wherein Y and Y^1 are both 2,6- diisopropylphenyl and Z and Z^1 are both hydrogen.

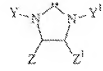
59. (Previously presented)A catalytic complex according to claim 13, wherein said nucleophilic carbene is of the formula:



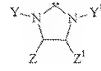
60. (Previously presented)A catalytic complex according to claim 17, wherein said nucleophilic carbene is of the formula:



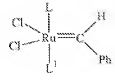
61. (Previously presented)The method of claim 24, wherein the nucleophilic carbene has the formula:



62. (Previously presented)The method of claim 26, wherein the nucleophilic carbene has the formula:



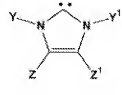
63. (Previously presented)A catalytic complex of the formula:



wherein

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L^1 is a nucleophilic carbene, wherein L^1 is of the formula

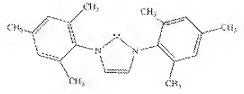


wherein Y and Y^1 are each independently an aryl group substituted with halogen, C_1-C_5 alkyl, or C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2[[$_1$]]-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally

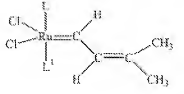
being substituted with C_1-C_5 alkyl, halogen, C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

64. (Previously presented)The catalytic complex of claim 63, wherein L^1 is



65-70. (Cancelled)

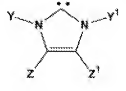
71. (Previously presented)A catalytic complex of the formula:



wherein

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L^1 is a nucleophilic carbene, wherein L^1 is of the formula

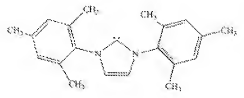


wherein Y and Y^1 are each independently an aryl group substituted with halogen, C_1-C_5 alkyl, or C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2[[,]]-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_5 alkoxy, or with a phenyl group substituted

with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

72. (Previously presented)The catalytic complex of claim 71, wherein L^1 is

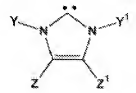


73-76. (Cancelled)

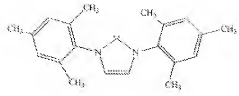
77. (Previously presented) The method of claim 23, wherein the diene is a diterminal diene.

78. (Previously presented) The method of claim 25, wherein the diene is a diterminal diene.

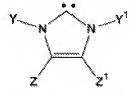
79. (Previously presented) The catalytic complex according to claim 13, wherein the nucleophilic carbene is of the formula:



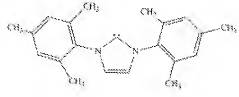
80. (Previously presented)The catalytic complex according to claim 79, wherein the nucleophilic carbene is of the formula:



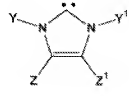
81. (Previously presented)The catalytic complex according to claim 17, wherein the nucleophilic carbene is of the formula



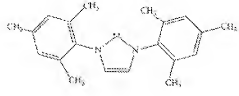
82. (Previously presented)The catalytic complex according to claim 81, wherein the nucleophilic carbene is of the formula:



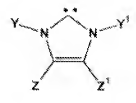
83. (Previously presented)The method according to claim 24, wherein the nucleophilic carbene is of the formula:



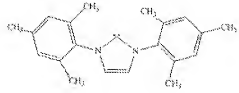
84. (Previously presented)The method according to claim 83, wherein the nucleophilic carbene is of the formula:



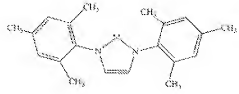
85. (Previously presented)The method according to claim 26, wherein the nucleophilic carbene is of the formula:



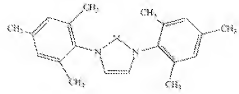
86. (Previously presented)The method according to claim 85, wherein the nucleophilic carbene is of the formula:



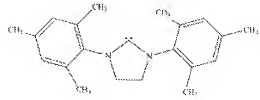
87. (Previously presented)The catalytic complex according to claim 39, wherein L^1 is of the formula:



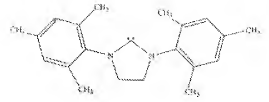
88. (Previously presented)The catalytic complex according to claim 9, wherein L is —P(cyclohexyl)$_3$, —P(cyclopentyl)$_3$, or —PPh$_3$ and L^1 is of the formula:



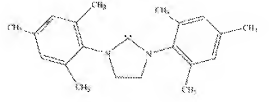
89. (Previously presented)The catalytic complex according to claim 59, wherein the nucleophilic carbene is of the formula:



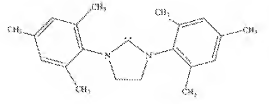
90. (Previously presented)The catalytic complex according to claim 60, wherein the nucleophilic carbene is of the formula



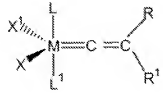
91. (Previously presented)The method according to claim 61, wherein the nucleophilic carbene is of the formula:



92. (Previously presented)The method according to claim 62, wherein the nucleophilic carbene is of the formula:



93. (Previously presented)A catalytic complex of the formula:



wherein M is Os or Ru;

R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, aryloxy, C_1-C_{20} alkylthio, C_1-C_{20} alkylsulfonyl, and C_1-C_{20} alkylsulfinyl, each R and R^1 optionally being substituted with C_1-C_5

alkyl, halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group;

X and X^1 are independently selected from the group consisting of anionic ligands;

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether;

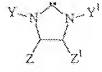
L^1 is a nucleophilic carbene; and

wherein the catalytic complex has one or more further characterization selected from the group consisting of

(1) at least 2 of X, X^1, L or L^1 are bonded together to form a multidentate ligand;

(2) the complex is linked to a solid support by means of a link between the solid support and the nucleophilic carbene or by means of a link between the solid support and at least one of the anionic ligands;

(3) L^1 has the formula

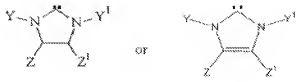


where Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

(4) any combination of the foregoing characteristics.

94. (Previously presented)The catalytic complex of claim 93, wherein said nucleophilic carbene is of the formula:

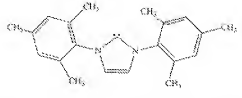


wherein

Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

95. (Previously presented)The catalytic complex according to claim 94, wherein the nucleophilic carbene is of the formula:



and wherein the further characterization of the catalytic complex is selected from the group consisting of

(1) at least 2 of X, X^1, L or L^1 are bonded together to form a multidentate ligand, and

(2) the complex is linked to a solid support by means of a link between the solid support and the nucleophilic carbene or by means of a link between the solid support and at least one of the anionic ligands.

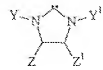
96. (Previously presented)The catalytic complex of claim 93, wherein the further characterization of the catalytic complex is that at least 2 of X, X^1, L or L^1 are bonded together to form a multidentate ligand.

97. (Previously presented)The catalytic complex of claim 93, wherein the further characterization of the catalytic complex is that the complex is linked to a solid support by means of a link between the solid support and the nucleophilic carbene or by means of a link between the solid support and at least one of the anionic ligands.

98. (Previously presented)The catalytic complex of claim 97, wherein the complex is linked to a solid support by means of a link between at least one of the anionic ligands and the solid support.

99. (Previously presented)The catalytic complex according to claim 97, wherein the complex is linked to a solid support by means of a link between the nucleophilic carbene and said solid support.

100. (Previously presented)The catalytic complex of claim 93, wherein the further characterization of the catalytic complex is that L^1 has the formula



101. (Previously presented)A catalytic complex according to claim 94, wherein Y and Y^1 are both 2,4,6-trimethylphenyl and Z and Z^1 are both hydrogen.

102. (Previously presented)A catalytic complex according to claim 94, wherein Y and Y^1 are both 2,6-diisopropylphenyl and Z and Z^1 are both hydrogen.

103. (Previously presented)The catalytic complex according to claim 93, wherein L is a phosphine.

104. (Previously presented)The catalytic complex according to claim 103, wherein L is $-P(cyclohexyl)_3$, $-P(cyclopentyl)_3$ or $-PPh_3$.

105. (Previously presented)The catalytic complex according to claim 93, wherein X and X^1 are independently selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl sulfonate.

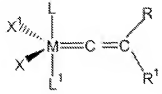
106. (Previously presented)The catalytic complex according to claim 105, wherein X and X^1 are both chloride.

107. (Previously presented)A method for synthesizing a polymer material, the method comprising contacting a monomer composition with the catalytic complex as described in any of claims 9, 14, 39, 44, 63, 64, 71, 72, 87, 88, 93, 98 or 99.

108. (Previously presented)The method of claim 107, wherein the monomer composition comprises a plurality of olefin molecules.

109. (Previously presented)The method of claim 107, wherein the olefin molecules are cyclic olefin molecules.

110. (Previously presented)A catalytic complex of the formula:



wherein M is Os or Ru;

R is hydrogen;

R^1 is tert-butyl;

X and X^1 are chloride;

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L^1 is a nucleophilic carbene of the formula

where Y and Y^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Y and Y^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, aryl, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_6 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

111. (Previously presented)A catalytic complex according to claim 110, wherein Y and Y^1 are both 2,4,6-trimethylphenyl and Z and Z^1 are both hydrogen.

112. (Previously presented)A catalytic complex according to any of Claims 9, 14, 39, 44, or 93 wherein at least one of R and R^1 is vinyl, phenyl, or hydrogen.

113. (Previously presented)A catalytic complex according to Claim 112 wherein at least one of R and R^1 is phenyl.

114. (Currently amended) A catalytic complex according to any of Claims 9, 14, ~~39,~~ or 44~~, or 93~~ wherein R ~~and~~or R^1 ~~together are~~ is an aryl group, and a rearrangement of C^1=C^2=C^3 with said aryl group forms an indenylidene.

115. (Currently amended) A catalytic complex according to any of Claims 9, 14, ~~39,~~ or 44~~, or 93~~ wherein R ~~and~~ or R^1 ~~together are~~ is a phenyl group, and a rearrangement of C^1=C^2=C^3 with said phenyl group forms a phenylindenylidene.

116. (Previously presented)A catalytic complex according to any of Claims 9, 14, 39, 44, or 93 wherein R and R^1 each independently or together are cyclic or polycyclic.

117. (Previously presented)A method according to Claim 23 or 25 wherein at least

one of R and R^1 is vinyl, phenyl, or hydrogen.

118. (Currently amended) A method according to Claim ~~116~~ 117 wherein at least one of R and R^1 is phenyl.

119. (Currently amended) A method according to ~~Claims 23 or 25~~ any of Claims 23, 24, 25, or 26 wherein R or ~~and~~ R^1 ~~together are~~ is an aryl group, and a rearrangement of $C^1=C^2=C^3$ with said aryl group forms an indenylidene.

120. (Currently amended) A method according to ~~Claims 23 or 25~~ any of Claims 23, 24, 25, or 26 wherein R or ~~and~~ R^1 is a phenyl group, and a carbon atom of said phenyl group together with $C^1=C^2=C^3$ is ~~together are~~ a phenylindenylidene.

121. (Previously presented)A method according to Claim 23 or 25 wherein R and R^1 each independently or together are cyclic or polycyclic.

122. (Previously presented)A catalytic complex according to any of Claims 39, 63, 71 or 110 wherein L is $-P(cyclohexyl)_3$, $-P(cyclopentyl)_3$, or $-PPh_3$.

123. (Previously presented)A catalytic complex according to any of Claims 9, 39, 63, 71, 93 or 110 wherein at least two of X, X^1, L or L^1 are bonded together to form a multidentate ligand.

124. (Previously presented)A method according to Claim 23 wherein at least two of X, X^1, L or L^1 are bonded together to form a multidentate ligand.

125. (Previously presented)A catalytic complex according to any of Claims 39, 63, or 71 wherein Y and Y^1 are each independently an aryl group substituted with halogen, C_1-C_5 alkyl, or C_1-C_5 alkoxy groups.

126. (Previously presented)A catalytic complex according to any of Claims 39, 63,

or 71 wherein Y and Y^1 are 2,4,6-trimethylphenyl or 2,6-diisopropyl, and Z and Z^1 are hydrogen.

127. (New) A catalytic complex according to Claim 115 wherein R and R^1 are phenyl groups.

128. (New) A method according to Claim 120 wherein R and R^1 are phenyl groups.